

smooth plaga is surrounded by a much larger depressed area, which is covered by a yellowish powdery pubescence and is deepest behind, where it commences a little in front of the basal margin, but becomes shallower as it widens out around the smooth plaga, to narrow again in front, where it extends close up to the antero-lateral angle. The sides of the pronotum are subparallel or slightly divergent from the base up to the beginning of the posterior third, and thence converge with a rather gentle curve up to the anterior border. Elytra with numerous punctures, of which the larger ones bear each a minute tuft of white hairs; the sides are sinuately emarginate just in front of the middle, then slightly curve out, to narrow again up to the apex, near which each is furnished with four or five very short teeth; the innermost costa of each elytron extends back but a short distance from the base and approaches the suture, the second costa reaches from the base to the extreme apex, the two outer costæ are shorter and less distinct. Body underneath densely foveolate-punctured, the punctures bearing small fascicles of whitish hairs. Prosternal process flat, produced and narrowed behind to an obtuse point, which fits into a corresponding channel extending along the whole length of the mesosternum; the pits on its surface are more or less elongated.

This splendid Buprestid, which is named in honour of its possessor, to whom I owe the privilege of describing it, seems at first sight to belong to the group of the Psilopterides; but its structural characters show that it is foreign to this group. Taking all its characters into consideration, I do not see that it can be better placed than in the genus *Chalcophoropsis*. The scutellum, though invisible, has its position marked by a small opening or depression at the base of the elytra.

XXXVI.—*The Specific Rank of Limax cinereo-niger, Wolf.*

By WM. DENISON ROEBUCK, F.L.S., Hon. Secretary to the Conchological Society.

THIS slug, although very closely allied to *L. maximus*, L., differs so markedly from it in several particulars, both as regards external and internal characters, as to make it impossible for it to be looked upon as a mere colour-variety, as is somewhat baldly asserted by Mr. Collinge in a note in the 'Annals' for December last. The two slugs differ in their dentition, in the anatomy of the genital organs,

and in the sculpture of the body, as well as in the coloration of the foot-sole and the body and shield; and, although some of these differences are individually not great, yet the sum or aggregate of them affords sufficient ground for considering *L. cinereo-niger* as entitled to rank as, at the very least, an incipient species, and for justifying malacologists in awarding to it the specific or subspecific rank which many authors give it.

To take the differences which exist, and first those in the anatomy of the genitalia. The importance of the reproductive organs of the Mollusca as a criterion for the distinction of species is universally recognized, and an examination of the very careful and accurate MS. figures of the genitalia of many individuals of both *L. maximus* and *L. cinereo-niger* which have been made by Mr. Charles Ashford, of Christchurch, Hants, shows that there are differences worthy of note. Mr. Ashford has found that the penis-sheath in *L. maximus* is very constant in its form, the upper part being much enlarged and peculiarly and rigidly flexed or bent upon itself, while in *L. cinereo-niger* the penis-sheath is longer and of tolerably equal width throughout, in which respect Mr. Ashford's figures tally with the one published by Schmidt. The sperm-duct in *L. cinereo-niger* is only very slightly attached to the oviduct in a part of its length, but in *L. maximus* moderate force is required to break the attachment. The relative sizes of other parts, as the albumen-gland, the ovo-testis, &c., in sexually mature specimens is constantly different in the two forms. *L. cinereo-niger* has a larger and less deeply coloured ovo-testis, its average length in three specimens from different localities being 29·6 millim., the shortest one being 15 millim., while the greatest length Mr. Ashford has noted in *L. maximus* is 13 millim. and the average in a number of examples no more than 11 millim. *L. cinereo-niger* has a smaller and narrower albumen-gland, its average length in the same three specimens being 9·6 millim. and the greatest length noted 13 millim., while in *L. maximus* the average of sexually mature specimens is 20 millim., that of *all*, including both mature and immature, 15½ millim. The difference in the point of origin of the retractor muscle of the penis is referred to by Dr. Scharff and corroborated by other writers.

I am well aware that the differences of the two forms anatomically are not so great nor of such importance as F. Sordelli, whose paper was my authority for the statement I made in the 'Journal of Conchology' in 1883, attached to them; yet that there are differences is quite certain from the

observations, which are both numerous and accurate, made by Mr. Ashford.

Another point of difference between the two forms under consideration is afforded by the radula, which is only second in importance to the reproductive organs as affording a criterion for the differentiation of molluscan species. Indeed some authors ascribe to it a much higher value in this regard. The differences in the radulæ of *L. maximus* and *L. cinereo-niger*, as figured by Heynemann, who was the acknowledged foremost limacologist of his time, in his paper "Ueber Schneckenzungen der Gattung *Limax*" (Mal. Blätt. 1863, pp. 200-218), are very striking. The teeth of *L. maximus* are simple in form nearly throughout, only the extreme outer teeth being shown as bifid, whereas in *L. cinereo-niger* the extreme outer teeth are simple, and the side-teeth are throughout bifid and even trifid.

The external characters, as I have pointed out more than once, are sufficiently distinctive to make *L. cinereo-niger* a particularly easy species to recognize. I have had ample opportunity for forming a judgment in this respect, as by far the greater proportion of the British specimens known have passed through my hands.

The sculpture of the two species is markedly different in character. In *L. maximus* the rugosities of the body are small, fine, and closely set in comparison with *L. cinereo-niger*, which has them large and coarse, with deep furrows separating them. In this respect it resembles *Arion ater*, and there can be little doubt that it is frequently mistaken for that species by inexperienced conchologists, more especially as the colour is often very similar, *L. cinereo-niger* being nearly always a very dark species, usually black, with but few pale markings, often none.

The differences in colour are important. One of the most striking characters of *L. cinereo-niger* is that the foot-sole is what may be loosely called "trifasciated," the two side-areas (longitudinal) being black, blackish, or dark-coloured, with the central area white. This is never the case with true *L. maximus*, but is a fairly constant character in *L. cinereo-niger*. I have on one or two occasions seen juvenile examples with the whole foot-sole white, but never adults.

The coloration of the shield offers another ready mark of distinction. *L. maximus* always has this part maculated or marbled; but in *L. cinereo-niger* there are no maculations or marblings, the shield being invariably of a uniform dark colour.

A less constant but very convenient character of *L. cinereo-*

*niger* is that the keel and a line continuing it along the back to where it joins the shield is the last part of the body to retain the light ground-colour. Except in the totally black variety (v. *maura*) *L. cinereo-niger* always has this keel and line more or less evident as a thin pale stripe.

This evidence will suffice to make it clear that, whatever views we may hold as to the specific or subspecific rank of *L. cinereo-niger*, it is not open for us to acquiesce in the statement that it "is simply one of the many colour-variations of the well-known *L. maximus*, L."

XXXVII.—*Note on the Variations of the Lateral Shields in the Three-spined Stickleback (Gastrosteus aculeatus).* By G. A. BOULENGER.

EVER since Cuvier proceeded to divide the Sticklebacks into species according to the presence or absence and the development of the lateral armour, the question of the value of this character has been much discussed. Most modern European writers, with the exception of Blanchard and Sauvage, have refused to accept Cuvier's species as such, although they have usually retained them as varieties or subspecies. These supposed species are, however, maintained provisionally by American authors, Jordan not long ago remarking that he has not yet met with distinctly intermediate forms either on the Atlantic or Pacific coast. Bonizzi, Day, and Fatio have published results of investigations into the variations of the spines and shields in the smooth-tailed form from one locality; but the differences in the lateral armour in northern brackish-water specimens do not appear to have yet been subjected to a thorough statistical examination.

In July last I collected indiscriminately in a tidal pool close to Ostend Harbour sixty-six specimens of the three-spined stickleback, with the object of testing their characters, as I had observed that the three principal forms, viz. *G. trachurus*, *G. semiarmatus*, and *G. gymnurus*, occurred promiscuously both in and outside the harbour. The result is interesting, as showing how complete the gradation between the shielded and the smooth form is and how much the characters may differ on the two sides of one and the same specimen. I have therefore recorded the number of lateral shields in all the specimens, and arranged them in a series from the most perfectly armoured to the naked specimens. The numbers given refer to the shields on either side, those of the left side